

Serial No.: 09/891,017
Reply to Office Action dated February 8, 2006

Docket No.: 1232-4727

REMARKS

Applicants respectfully request reconsideration of this application in view of the foregoing amendments and the following remarks.

Claim Status

Claims 1-78 are pending. Pursuant to a previous election made by Applicants, claims 8-36, 44-72, 74, 75, 77 and 78 have been withdrawn from consideration. Claims 1, 2, 37, 38, 73 and 76 are rejected. Claims 3-7 and 39-43 have been objected to.

By this amendment, claims 1, 2, 37, 38 and 76 have been amended, as shown above. Support for this amendment is found throughout the specification, for example, at page 12, lines 9-19. Of the claims under examination, claims 1, 37 and 76 are independent in form. Entry of this amendment is respectfully requested. No new matter has been added.

Allowable Subject Matter

Claims 3-7 and 39-43 have been indicated as being drawn to allowable subject matter, but are objected to for depending from a rejected base claim.

Claim Rejections – 35 U.S.C. § 103

Claims 1, 37, 73 and 76 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 5,331,442 to Sorimachi (“Sorimachi”) in view of U.S. Patent No. 6,377,711 to Morgana (“Morgana”) further in view of U.S. Patent No. 5,471,241 to Hieda (“Hieda”). Claims 2 and 38 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Sorimachi in view of Morgana and Hieda further in view of U.S. Patent No. 5,874,988 to Gu (“Gu”).

Applicants respectfully disagree with the characterization of the claims and the prior art in the stated rejections and respectfully traverse these rejections.

Amended independent claims 1, 37 specifically recite “changing a gain according to the hue difference detected by said hue difference detector” and amended

Serial No.: 09/891,017

Docket No.: 1232-4727

Reply to Office Action dated February 8, 2006

independent claim 76 specifically recites "changing a gain according to the detected hue difference."

According to the configuration in claim 1, the hue difference detector detects a hue difference between adjoining pixels, and the gain control means changes the gain in accordance with the detected hue difference between adjoining pixels. Specifically, when the hue difference is large, the gain is increased to weaken the edge enhancement, whereas when the hue difference is small, the gain is increased to strengthen the edge enhancement (page 12, lines 13-19). Then, the luminance edge enhancement means enhances an edge using the gain changed by the gain control means.

In this manner, the gain to be used in the edge enhancement is changed in accordance with the hue difference between adjoining pixels, and jaggedness in particular cases such that the edge is the boundary between a red color area and a blue color area as shown in Fig. 12A, and the RGB color filter covers an image sensing element (see page 3, lines 6 to page 4, line 10) can be prevented.

In contrast, none of Sorimachi, Morgana or Hieda, taken individually or in combination, teaches or suggests a hue difference detector and a gain control means for changing a gain according to the hue difference detected by the hue difference.

The Office Action admits that Sorimachi fails to disclose detecting a hue difference between adjoining pixels. (See Office Action, p. 3). According to Sorimachi, whether to perform edge enhancement is determined based only the hue of an image signal to be processed, and more specifically, based on whether the image signal is of a development color for printing. Thus, in Sorimachi, edge enhancement is not performed based on the relationship between two adjoining pixels, and the resulting edge enhancement is completely different from the claimed invention.

The Office Action claims that Morgana teaches a system for detecting edges by comparing the hue of the pixel with neighboring pixels at figures 5, 10, column 3, lines 5-12 and column 6, lines 20-47. (Office Action, p. 3). However, in Morgana, edge detection system 400 is for detecting edges and its operation corresponds to edge detection filter 37 in Sorimachi, and not to hue detection circuit 35 in Sorimachi. Accordingly, Applicants submit that one of ordinary skill in the art would not replace hue detection circuit 35 of Sorimachi with edge detection system 400 while maintaining edge detection filter 37 of Sorimachi.

Furthermore, in Morgana, comparator 440 compares the image data attributes of neighboring pixels (column 6, lines 31-38), but the data compared may be brightness, saturation and the amount of cyan, magenta, yellow and black colorants of the pixels as disclosed in column 3, lines 8-10, instead of the hue, and the comparison result is not necessarily the difference. Moreover, in Morgana, there is no disclosure that edge detection system 400 outputs a hue difference. In addition, there is no teaching about using the comparison result, other than for detecting edges, and more specifically there is no teaching about using the comparison result for edge enhancement.

The Office Action admits that Sorimachi and Morgana fail to disclose enhancing an edge pixel in an image by amplifying an edge luminance signal by a gain. (Office Action, p. 3). Hieda discloses to adjust the horizontal- and vertical-contour signals, extracted by high-pass filters 129 and 132, by gains at Fig. 2 and column 9, lines 13-28. However, Hieda fails to disclose that the gains are changed in accordance with the hue difference. In Hieda, only a luminance signal (output from Y (luminance) low-pass filter 122 through high-pass filter 129) is inputted to gain control circuit 130, and therefore, it is not possible to control the gain in gain control circuit 130 based on any type of chromatic signals (including the hue difference).

Serial No.: 09/891,017

Docket No.: 1232-4727

Reply to Office Action dated February 8, 2006

Accordingly, Applicants assert that neither the hue difference detector nor "changing a gain according to the hue difference detected by said hue difference detector" of claims 1 and 37 or "changing a gain according to the detected hue difference" of claim 76 is taught, suggested or otherwise rendered obvious by Sorimachi, Morgana and/or Hieda, taken individually or in combination.

Applicants have chosen in the interest of expediting prosecution of this patent application to distinguish the cited documents from the pending claims as set forth above. These statements should not be regarded in any way as admissions that the cited documents are, in fact, prior art. Likewise, Applicants have not specifically addressed the rejections of the dependent claims. Applicants respectfully submit that the independent claims, from which they depend, are in condition for allowance as set forth above. Accordingly, the dependent claims also are in condition for allowance for at least similar reasons. Applicants, however, reserve the right to address such rejections of the dependent claims in the future as appropriate.

CONCLUSION

Accordingly, Applicants respectfully submit that the present invention as recited in the independent claims and the claims depending therefrom, is neither taught nor suggested by, and therefore is neither anticipated nor rendered obvious by the prior art, taken individually or in combination. That is, Applicants respectfully submit that the present invention as claimed defines patentable subject matter over the prior art of record.

Based on the foregoing, Applicants respectfully request reconsideration and withdrawal of the rejections and allowance of this application. The Examiner is invited to contact the undersigned at the number provided below should a telephone conference be useful or necessary.

Serial No.: 09/891,017

Docket No.: 1232-4727

Reply to Office Action dated February 8, 2006**AUTHORIZATION**

While the petitioned extension of time is believed sufficient, should an additional extension of time be necessary to render this filing timely, such extension is hereby petitioned and the Commissioner is hereby authorized to charge any fees, or credit any overpayment to Deposit Account No. 13-4500, Order No. 1232-4727.

Respectfully submitted,
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-22 of 22-

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